

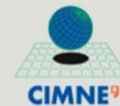


AIDA

AFFIRMATIVE
INTEGRATED
ENERGY
DESIGN
ACTION

Principles of Integrated Energy Design in the municipal practice

Jose Santos,
19th September 2013



Co-funded by the Intelligent Energy Europe
Programme of the European Union



CIMNE

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The screenshot shows the CIMNE website homepage. At the top left is the CIMNE logo, consisting of a blue sphere and the text 'CIMNE^R International Center for Numerical Methods in Engineering'. To the right of the logo is a date and time display: 'Tuesday, January 29, 2013' and 'Access'. Below the date is a search bar. To the right of the search bar are social media icons for Facebook, LinkedIn, Twitter, YouTube, and RSS. Below these is a navigation menu with links: Home, About, CIMNE in the world, Publications, Events, Research, People, and Technology Transfer. The main content area features a large graphic with a red mechanical arm and the text '25 years of Numerical Methods'. At the bottom of the graphic is a green banner with the text: 'The International Center for Numerical Methods in Engineering is an autonomous research center with the mission of fostering the development, dissemination and application of numerical methods for the solution of engineering problems in an international context.'

The **International Center for Numerical Methods in Engineering** is public research center with the mission of fostering the development, and application of numerical and simulation methods for the solution of engineering problems in an international context.



BEE Group - CIMNE

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BEE Group

The **Building Energy and Environment Group (BEE)** is an autonomous research unit of CIMNE. It was founded in 2001. It has two main headquarters:

◆ **CIMNE-Terrassa:** It is placed at GAIA building of the UPC of Terrassa .



◆ **CIMNE-UdL Classroom:** It is placed at CREA building of the University of Lleida.





The AIDA project

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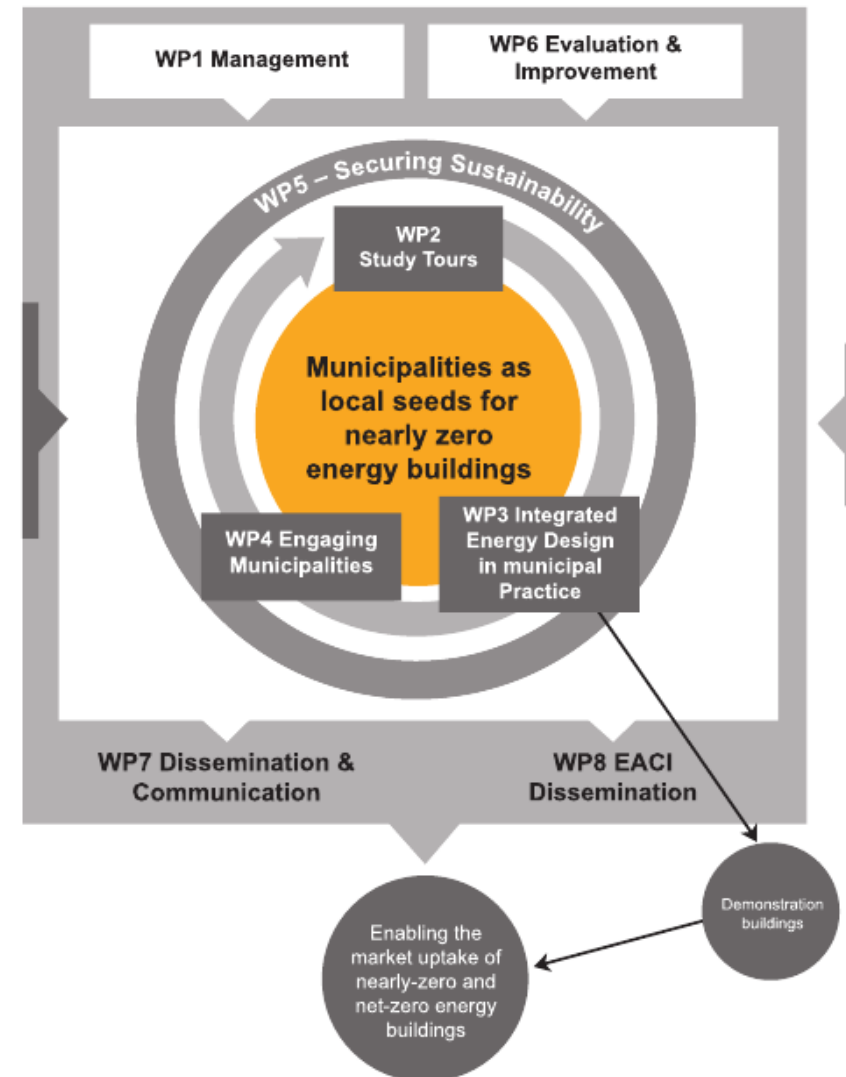
The AIDA project aims to accelerate the market entry of NZEB.

Target groups

- Municipal representatives
- Architects
- Master-builders.

Actions

- Study tours
- Success stories
- Active support for municipalities
- Close cooperation with key actors





The AIDA consortium

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TECHNISCHE
UNIVERSITÄT
WIEN
Vienna University of Technology



= Vienna University of Technology - Energy Economics Group



= AEE - Institute for Sustainable Technologies



Spain CIMNE BEEGROUP, - Building Energy and Environment



Greece Centre for Renewable Energy Sources and Saving - Energy Policy Analysis Department



Italy EURAC research - Institute for Renewable Energy



Italy Geonardo Environmental Technologies Ltd.



France HESPUL - énergies renouvelables & efficacité énergétique



Spain IREC - Catalonia Institute for Energy Research



United Kingdom Greenspace Live Ltd.



Europe Energy Cities (sub-contractor)



AIDA: Study tours

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*Blood and Tissue
Bank of Catalunya
Barcelona (ES)*



*Kehrerhof Siebeneich
Bolzano (IT)*



*Naturaliabau
Merano (IT)*



*RCTECH's HQ
Athens (GR)*



*Retrofitted
multi-family house
Kapfenberg (AT)*



*Salewa Spa HQ
Bolzano (IT)*



*Student Dormitories
"Aliko Perroti"
at the American
Farm School
Thessaloniki (GR)*



*HLFS Forstwirtschaft
Bruck an der Mur (AT)*



*Regional
Environmental
Center HQ
Szentendre (HU)*

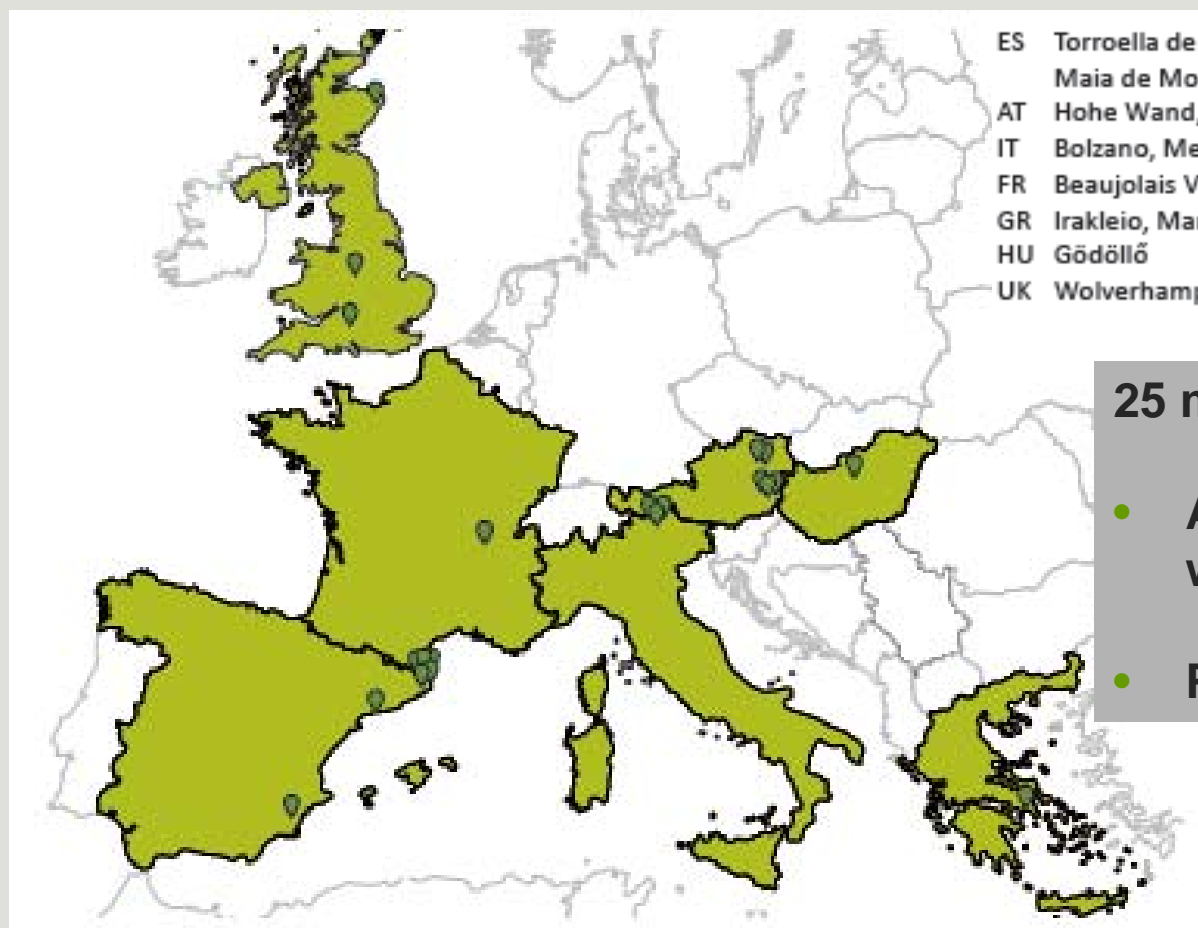


AIDA: Municipalities

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ES Torroella de Montgri, Gualta, Ordís, Girona, Tarragona, Figueres, Maia de Montcal, Murcia
AT Hohe Wand, Gutenstein, Hartberg, Gleisdorf, Weiz
IT Bolzano, Merano, Brixen
FR Beaujolais Val de Saone
GR Irakleio, Maroussi
HU Gödöllő
UK Wolverhampton, Hampshire Council, Grampian Regional Council

25 municipalities engaged in:

- Actions to promote NZEB within SEAP
- Public tenders of NZEB



Background: SEAP

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A **SEAP** is the key document in which the Covenant signatory outlines how it intends to reach its CO₂ reduction target by 2020.

It defines the activities and measures set up to achieve the targets, together with time frames and assigned responsibilities.

Template: http://www.eumayors.eu/support/library_en.html

Two sections:

1. Baseline Emission Inventory and local baseline.
2. Sustainable Action Plan



Background: SEAP

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Case: Girona (Catalonia)

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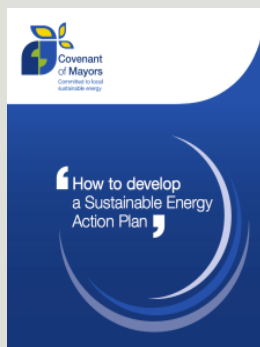
Torroella de Montgrí



Ordis



Gualta



Generic guide to incorporate NZEB actions in
180 municipalities



Integrated Energy Design

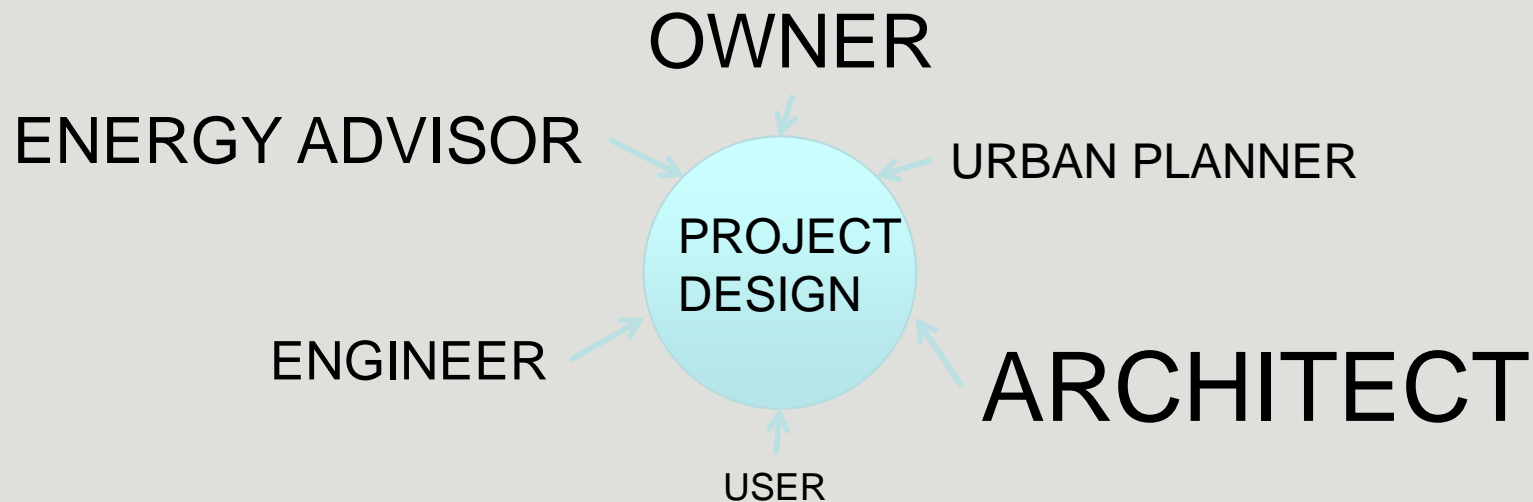
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What is Integrated Energy Design (IED)?

A shared working design methodology where all the stakeholders can give feedbacks to achieve the fixed targets



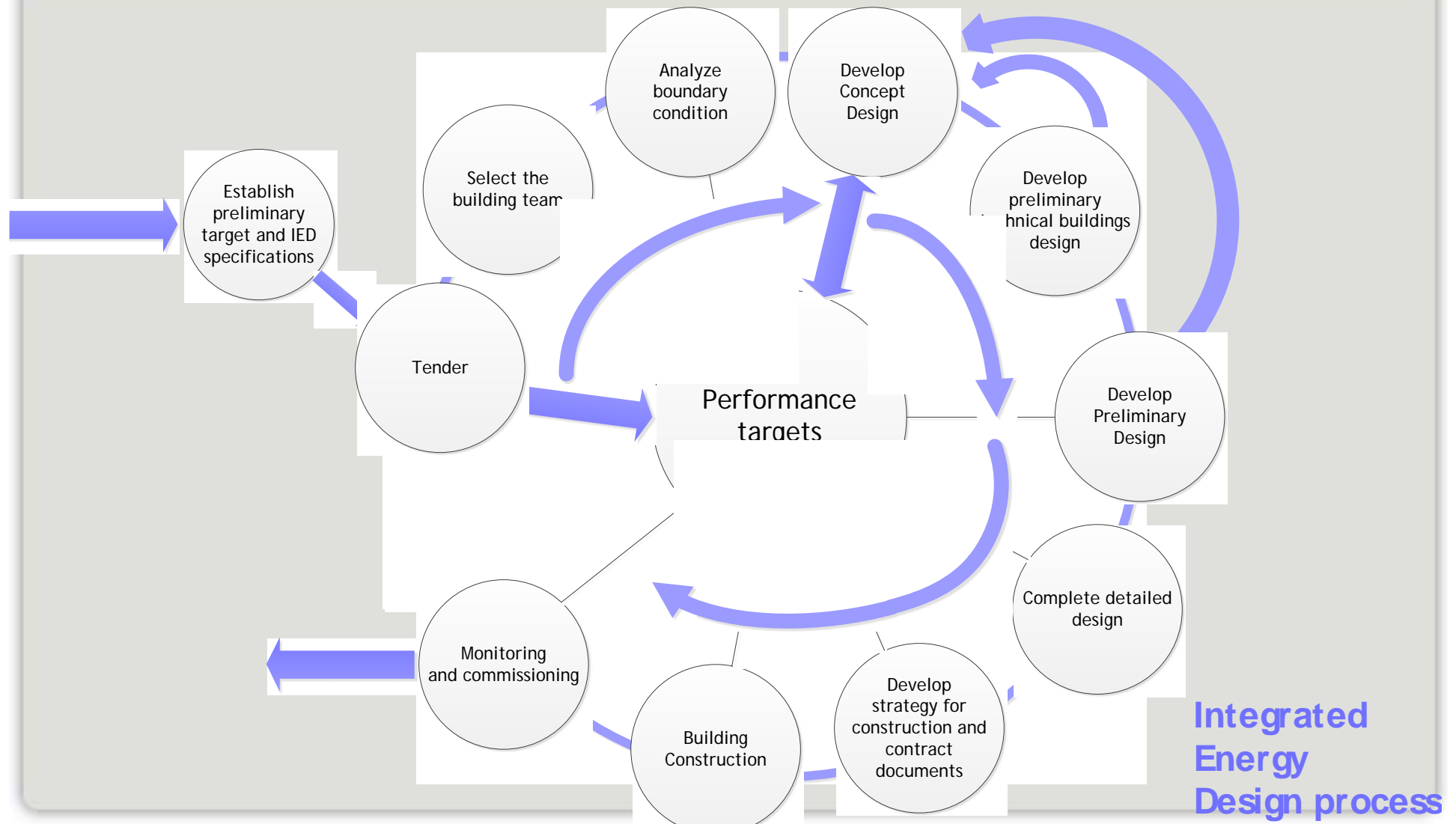


IED design process

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IED design process

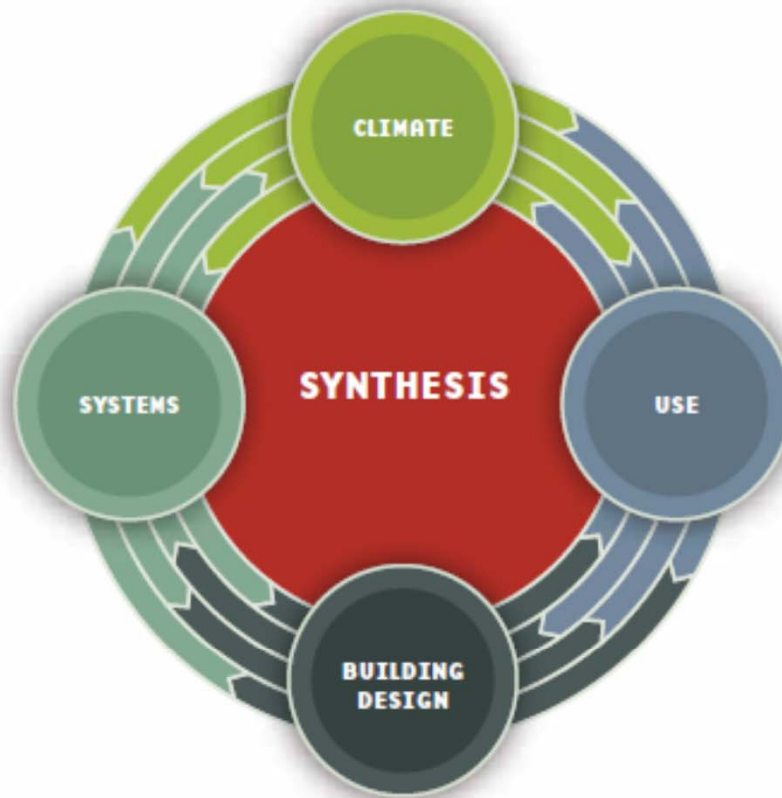
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SYSTEMS

Systems designed to integrate climate and use strategies and sized to meet optimized loads.



CLIMATE

Climate is often considered a liability.
View it instead as a resource.

USE

Even small adjustments to operating schedules, comfort criteria and use patterns can make a significant difference in a building's energy consumption.

BUILDING DESIGN

Design strategies (daylighting, natural ventilation, shading, and others) are related to decision about building site, form, organization, and major materials.



Integrated Energy Design

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The AIDA project applies the IED to promote the nearly Zero-Energy Buildings (nZEBs)

Why?

- To break the traditional design procedures for building construction.
- To create an work team integrated between architects, engineers, advisors as well as owners.
- To assess step by step the design choices performances, pursuing the highest energy efficiency targets.



Integrated Energy Design

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Principles for the IED process

1. To fix the **energy target** in compliance with the tender
2. To define the **design team**. It will be composed by different figures with different specifications. At the beginning the group will be made of municipality representatives, AIDA partner, architects/engineers, future tenants or manager of the buildings



Integrated Energy Design

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Principles for the IED process

3. To organize the whole planning of the design, defining a **work method**, with milestones and deliverables as well as a suitable timing.

4. To **detect constraints** due to climate conditions, building location, users necessities, building functions, architectural/aesthetical issues, building regulation requirements



Integrated Energy Design

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Principles for the IED process

5.To run steady state/dynamic simulations to achieve quantitative results for different alternative solutions

6.To compare different solution sets, considering also the costs/benefits.



Related experience: SEMANCO

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What ?

SEMANCO is a three year research project co-funded by the FP7 “ICT systems for Energy Efficiency” programme of the European Union. It began in September 2011.

The research is developing IT tools and methods to help planners and developers to reduce CO2 emissions in our neighbourhoods, cities and regions.

SEMANCO

SEMANTIC TECHNOLOGIES FOR CARBON
REDUCTION IN URBAN PLANNING



SEMANCO

SEMANTIC TECHNOLOGIES FOR CARBON REDUCTION IN URBAN PLANNING

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laSalle ARQ
Ramon Llull University



Who?

Nine partner organisations, including universities, IT developers, consultants and community groups

Six EU countries

Three case studies :

Manresa (Barcelona), Spain

North Harbour (Copenhagen), Denmark

Riverside Dean (Newcastle), United Kingdom



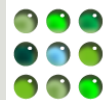
Campaigning for Warm Homes



Habitatge i Rehabilitació de Manresa



Hochschule
Albstadt-Sigmaringen
Albstadt-Sigmaringen University



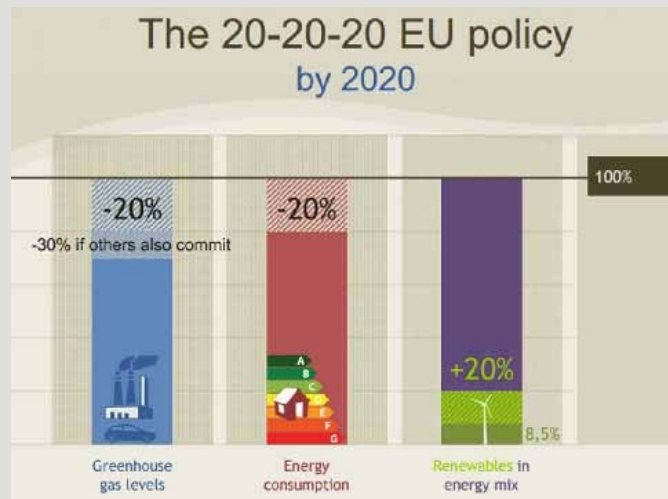
AGENCY9



Why?

CO₂ emissions reduction must be addressed at multiple geographic, social and economic levels by several different types of people.

The tools developed in the project are aimed to enable better quality decisions to be made about how to reduce CO₂ emissions in urban environments.





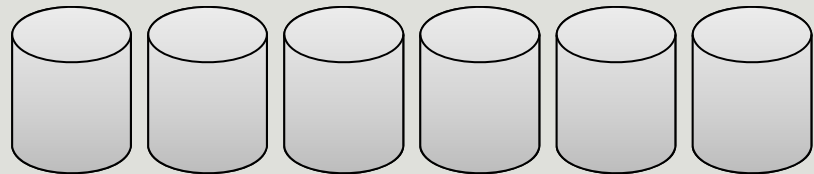
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SEMANTIC TECHNOLOGIES FOR CARBON REDUCTION IN URBAN PLANNING

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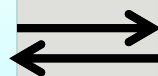
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open data (cadaster, padr , types of buildings, ...)



SEIF



URSOS



**SEMANCO INTEGRATED
PLATFORM**

Visualisation tools, urban tools, comparison tools, ...)

Sorry... How?

We will:

Use data available (building level,
neighbourhood level, ...)

Feed an engine calculation (URSOS)
with all this data.

Visualize the data available
Modify current parameters
Create new urban models and store
them as alternatives.

Run comparisons between them

... ..



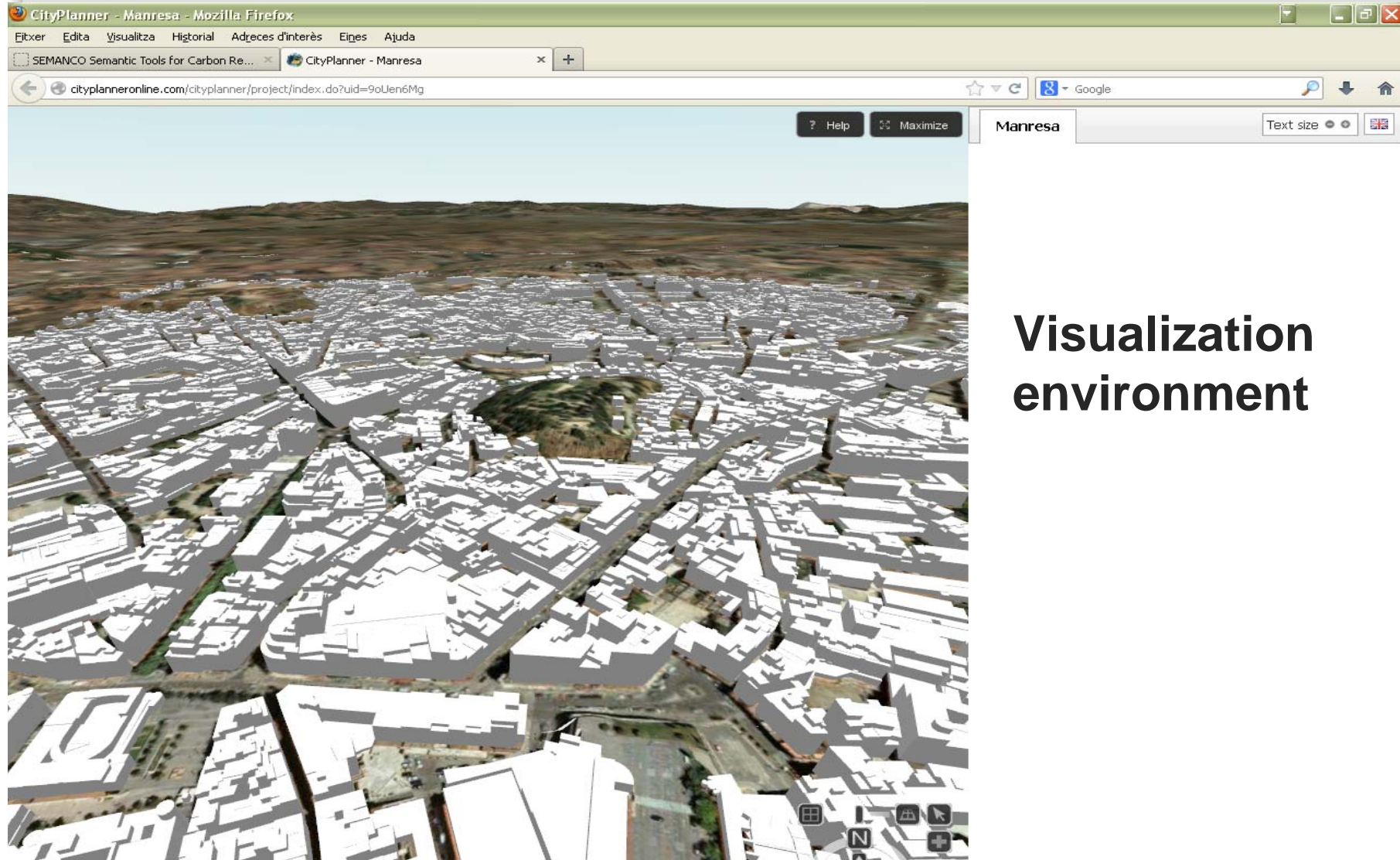
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**Visualization
environment**



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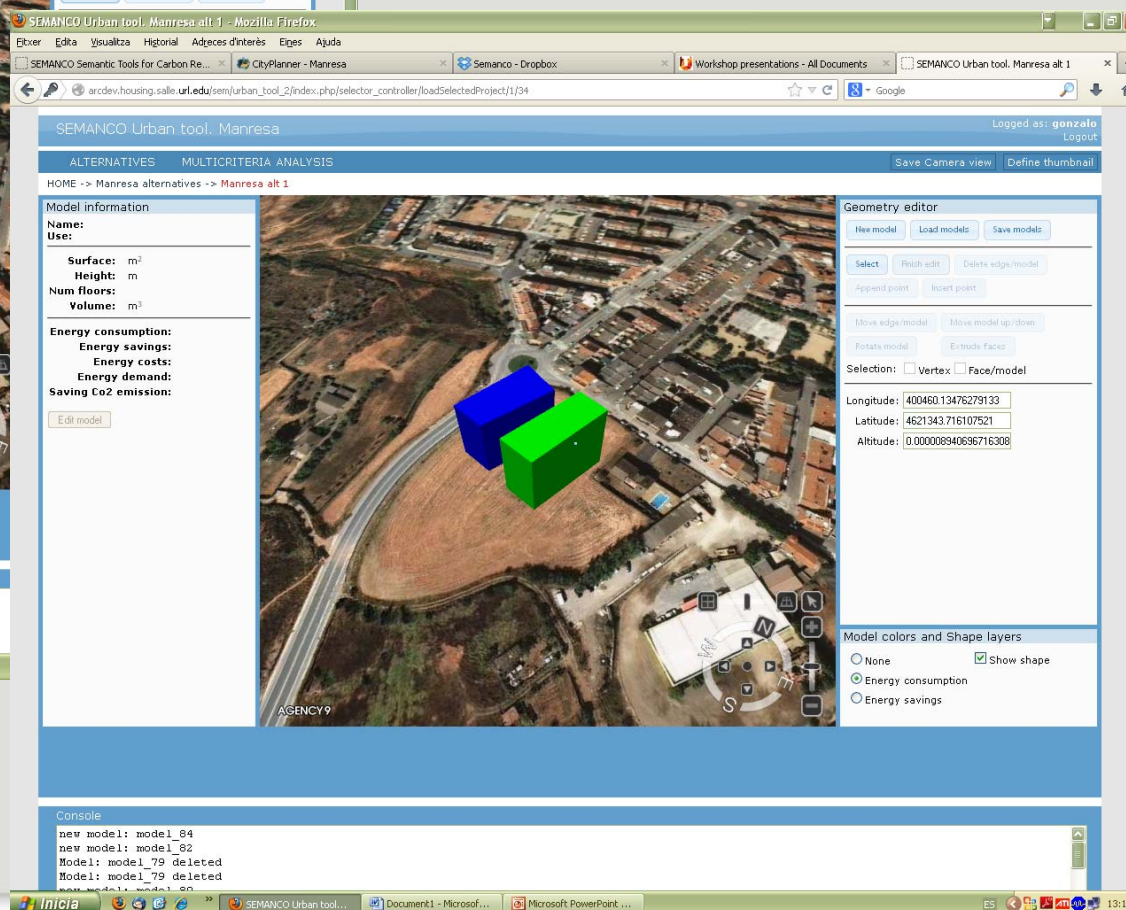
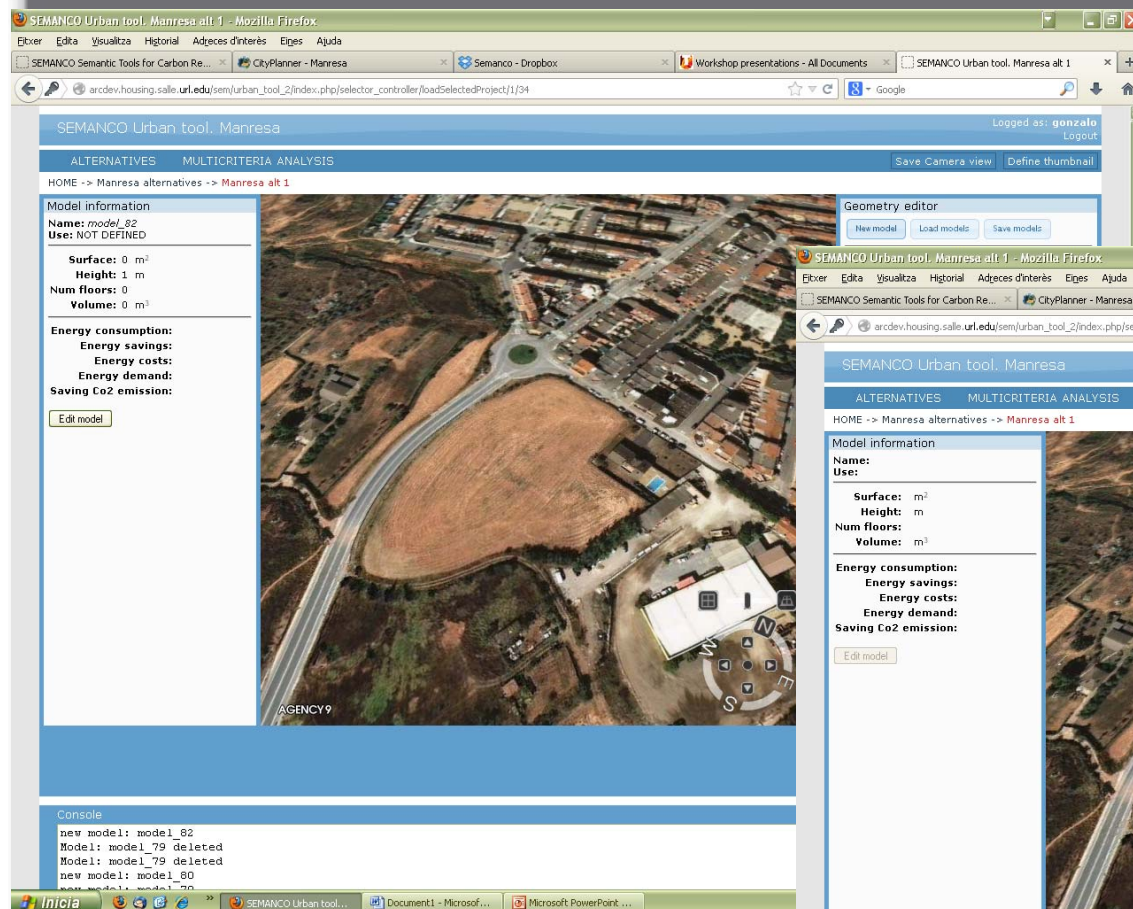
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Intervention environment





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<User name>

Visualization

Intervention > Multiple Buildings

Activities:

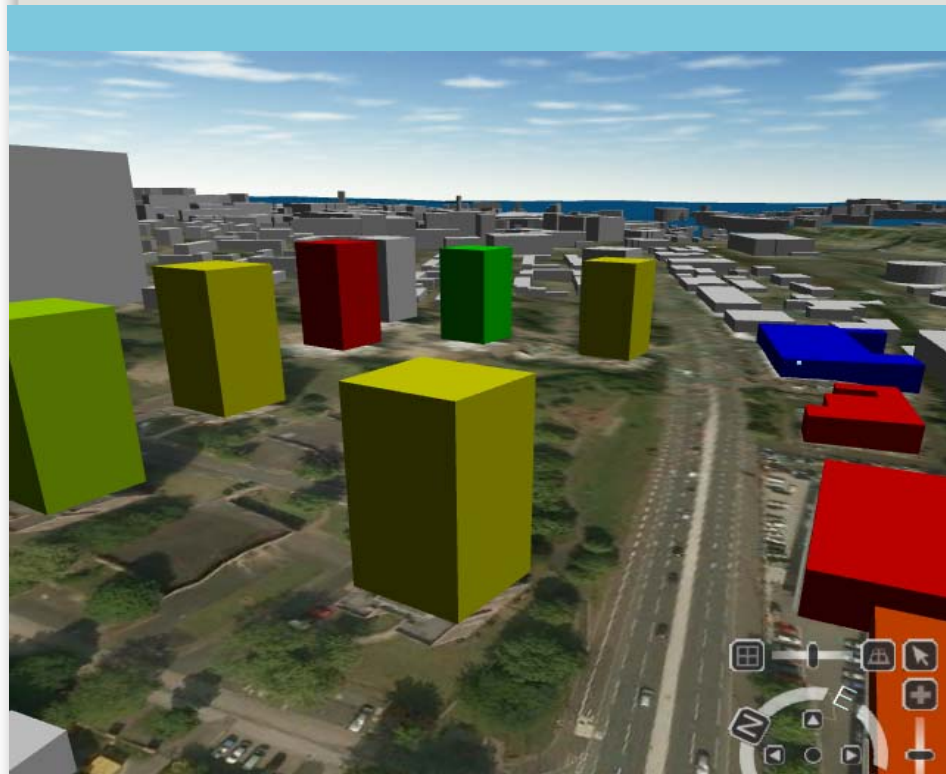
Select buildings ✓

Edit building parameters ✓

Run energy simulation

Propose improvements

Store results



Selected building

Indicators

Buildings

View

Settings

Performance indicators

- ☒ CO2 emissions
- ☐ Primary energy consumption
- ☐ Electricity consumption.
- ☐ SAP rate/ Certification rate
- ☐ Energy demand
- ☐ CO2 emissions Ratio.
- ☐ ...

■ 100-200 tCO₂/year

■ 200-300 tCO₂/year

■ 300-400 tCO₂/year



Related experiences: MARIE

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MARIE

MEDITERRANEAN BUILDING
RETHINKING FOR ENERGY
EFFICIENCY IMPROVEMENT



Projet cofinancé par le Fonds Européen
de Développement Régional

Project cofinanced by the European
Regional Development Fund

<http://www.marie-medstrategic.eu/>

- To develop and adopt new requirements and tools to achieve EPBD goals.
- To Find financial mechanisms to stimulate thermal retrofitting of buildings.
- Energy renovation support to local medium and small businesses.

Mediterranean regions: 9 countries and 23 partners



MARIE: partners

<http://www.marie-medstrategic.eu/en/partners.html>



- Effinergie · [Show on map](#) · [Partner's Website](#)
- CRMA - Chambre Régionale de Métiers et de l'Artisanat · [Show on map](#) · [Partner's Website](#)
- CR PACA - Région Provence-Alpes-Côte-d'Azur · [Show on map](#) · [Partner's Website](#)
- IREC - Institut de Recerca en Energia de Catalunya · [Show on map](#) · [Partner's Website](#)
- Generalitat de Catalunya - Departament de Territori i Sostenibilitat · [Show on map](#) · [Partner's Website](#)
- Generalitat de Catalunya - ACC1Ó · [Show on map](#)
- EPSA - Public Land Agency of Andalusia · [Show on map](#)
- Associació LIMA - Low Impact Mediterranean Architecture Association · [Show on map](#) · [Partner's Website](#)
- CTFC Centre Tecnològic Forestier de la Catalogne · [Show on map](#)
- Regione Umbria · [Show on map](#) · [Partner's Website](#)
- Regione Piemonte · [Show on map](#) · [Partner's Website](#)
- Regione Basilicata · [Show on map](#) · [Partner's Website](#)
- AREA Science Park · [Show on map](#) · [Partner's Website](#)
- A.R.E. Liguria · [Show on map](#) · [Partner's Website](#)
- University of Evora · [Show on map](#) · [Partner's Website](#)
- Institute of Accelerating Systems and Applications · [Show on map](#) · [Partner's Website](#)
- ANKO SA - West Macedonia Development Company · [Show on map](#) · [Partner's Website](#)
- University of Ljubljana · [Show on map](#) · [Partner's Website](#)
- GOLEA - Local Energy Agency · [Show on map](#) · [Partner's Website](#)
- UMAR · [Show on map](#) · [Partner's Website](#)
- LCA - Local Councils' Association · [Show on map](#) · [Partner's Website](#)
- Lanarca Municipality · [Show on map](#) · [Partner's Website](#)
- Bar Municipality · [Show on map](#) · [Partner's Website](#)



CIMNE



MARIE: Our work

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“Consultant for development of Design and Implementation of Urban Plans for Energy Efficiency Improvement in existing buildings”

1- Define a METHODOLOGY and TOOLS for calculating energy efficient urban plans

2- Implementation of the methodology in the Pilot Activity of Bar (Montenegro)



OPŠTINA BAR

3- Analysis of the impact and conclusions of comparison between the other different Pilot Activities.

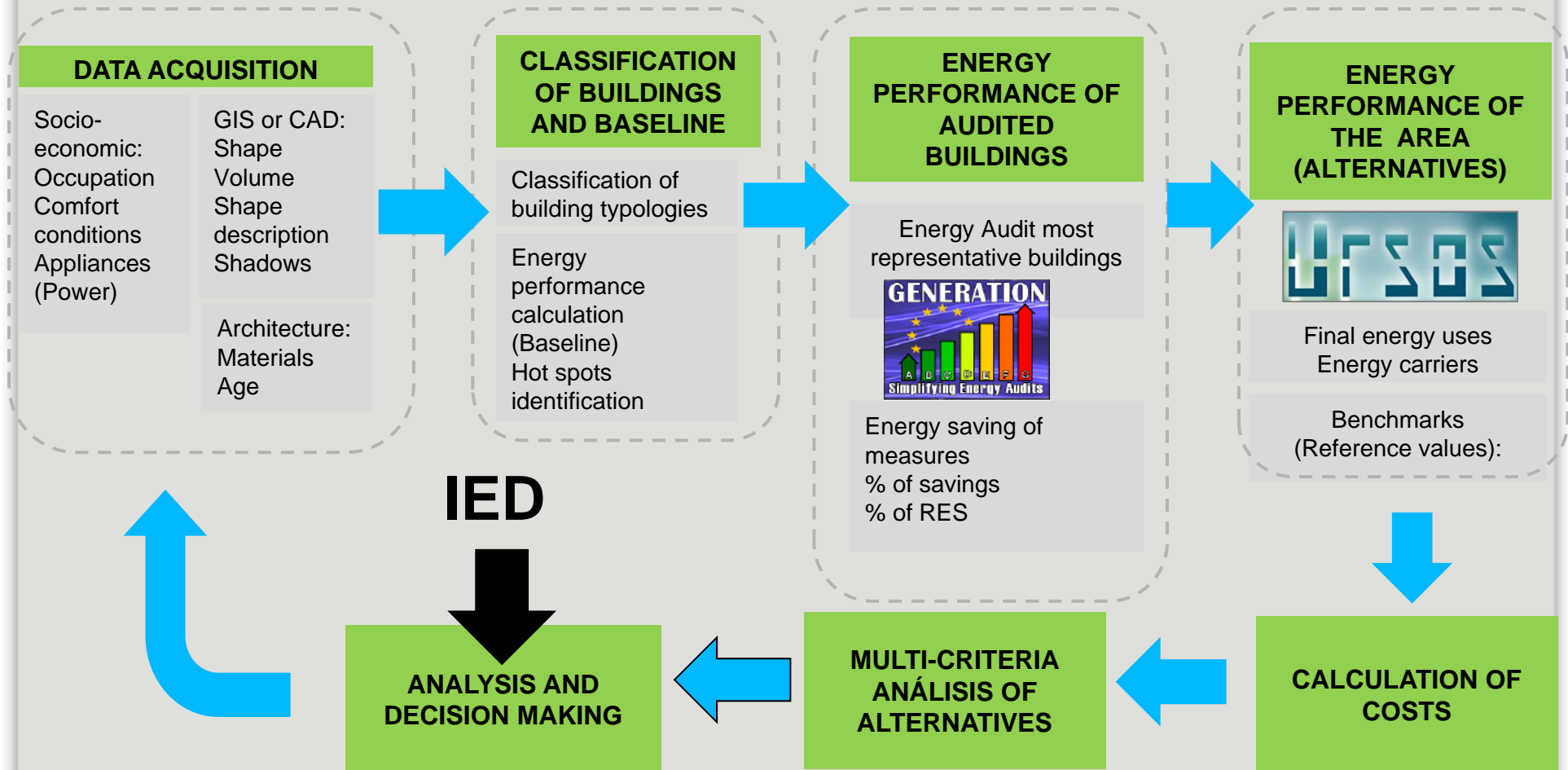


MARIE: Methodology for an energy efficient urban planning

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Pilot Activity:

Municipality of Bar (Montenegro)

BASELINE



MARIE

MEDITERRANEAN BUILDING
RETHINKING FOR ENERGY
EFFICIENCY IMPROVEMENT



OPŠTINA BAR



Projet cofinancé par le Fonds Européen
de Développement Régional
Project cofinanced by the European
Regional Development Fund

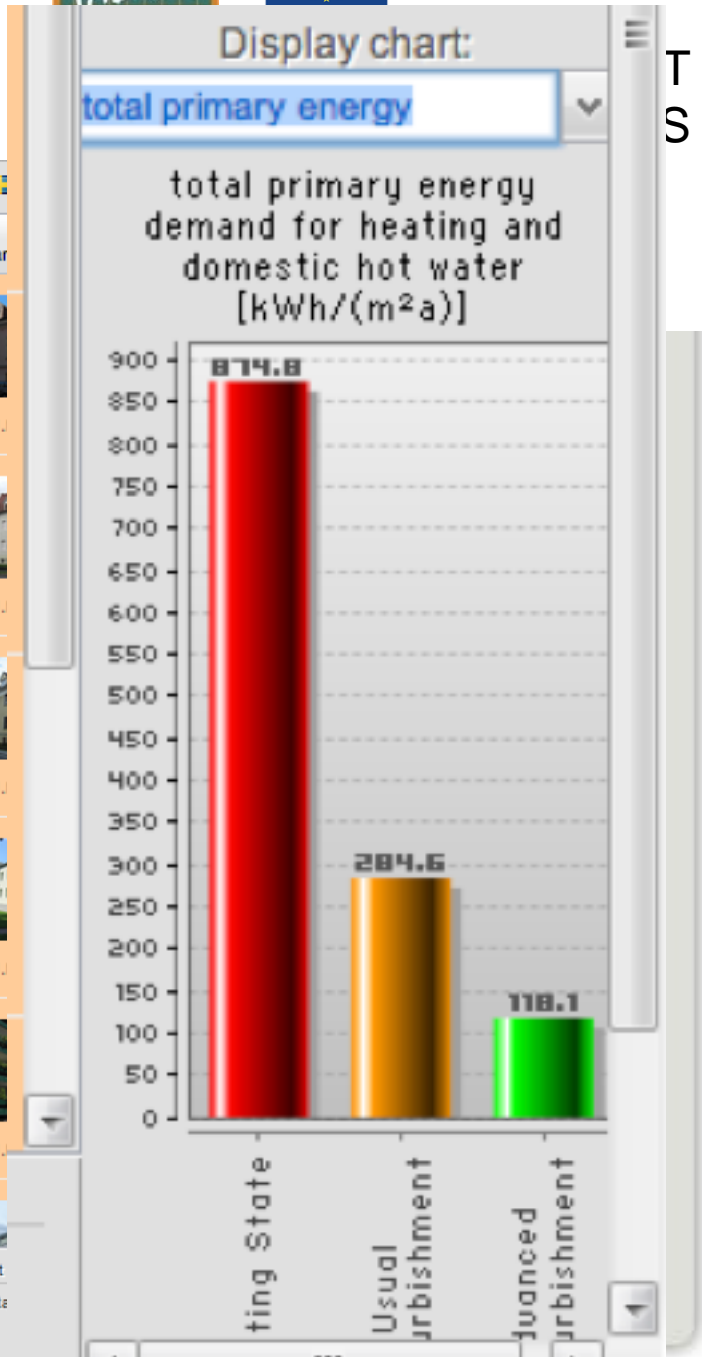
Building Reference	Building pictures	Typology	Construction period	Last year of retrofitting	Type of Use	Building sizes
B1		T1	80s		Mixed1	Bg
B2		T1	80s		Mixed1	Bg
B10		T1	70s	1980	Mixed1	Bg
B11		T1	70s	1980	Mixed2	Bg
G11B		T1	80s		Mixed1	Bg
G14		T1	60s	1980	Mixed1	Bg
E5		T1	80s		Mixed2	Bg
E8		T1	80s		Mixed2	Bg

Reference of TABULA project WEBTOOL



Co-funded by the Intelligent Energy Europe
Programme of the European Union

Country				Region		Construction Year Class		Additional Classification		SFH Single Family House		TH Terraced House		MFH Multi Family House	
Austria				national (Gesamt-Österreich)		... 1919		generic (Standard / allgemein typisch)		AT.N.SFH.01.Gen		AT.N.TH.01.Gen		AT.N.MFH.01.Gen	
Austria				national (Gesamt-Österreich)		1919 ... 1944		generic (Standard / allgemein typisch)		AT.N.SFH.02.Gen		AT.N.TH.02.Gen		AT.N.MFH.02.Gen	
Austria				national (Gesamt-Österreich)		1945 ... 1960		generic (Standard / allgemein typisch)		AT.N.SFH.03.Gen		AT.N.TH.03.Gen		AT.N.MFH.03.Gen	
Austria				national (Gesamt-Österreich)		1961 ... 1980		generic (Standard / allgemein typisch)		AT.N.SFH.04.Gen		AT.N.TH.04.Gen		AT.N.MFH.04.Gen	
Austria				national (Gesamt-Österreich)		1981 ... 1990		generic (Standard / allgemein typisch)		AT.N.SFH.05.Gen		AT.N.TH.05.Gen		AT.N.MFH.05.Gen	
Austria				national (Gesamt-Österreich)		1991 ... 2000		generic (Standard / allgemein typisch)		AT.N.SFH.06.Gen		AT.N.TH.06.Gen		AT.N.MFH.06.Gen	
Austria				national (Gesamt-Österreich)		2001 ... 2010		generic (Standard / allgemein typisch)		AT.N.SFH.07.Gen		AT.N.TH.07.Gen		AT.N.MFH.07.Gen	
Austria				national (Gesamt-Österreich)		2011 ... 2020		generic (Standard / allgemein typisch)		AT.N.SFH.08.Gen		AT.N.TH.08.Gen		AT.N.MFH.08.Gen	
Austria				national (Gesamt-Österreich)		2021 ... 2030		generic (Standard / allgemein typisch)		AT.N.SFH.09.Gen		AT.N.TH.09.Gen		AT.N.MFH.09.Gen	
Austria				national (Gesamt-Österreich)		2031 ... 2040		generic (Standard / allgemein typisch)		AT.N.SFH.10.Gen		AT.N.TH.10.Gen		AT.N.MFH.10.Gen	



T
S



Analysis and IED process

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Simulation of alternatives for the Best future scenarios

ANALYSIS

MATRIX OF
EXISTING
BUILDINGS
(54 buildings)

Selection of
the most
representative
buildings

DATA
TABLES
FOR
GENERATION
TOOL
(8 buildings)

Extrapolation
of typologies



Simulations
of typologies

Municipality of Bar

Improvement
measures

Stakeholders

Expert knowledge

IED



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Thank you for your attention